

(19) World Intellectual Property
Organization
International Bureau



(43) International Publication Date
11 August 2005 (11.08.2005)

PCT

(10) International Publication Number
WO 2005/072060 A2

(51) International Patent Classification: Not classified

(21) International Application Number:
PCT/IL2005/000116

(22) International Filing Date: 1 February 2005 (01.02.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
160152 1 February 2004 (01.02.2004) IL

(71) Applicant (for all designated States except US): RAFAEL
- ARMAMENT DEVELOPMENT AUTHORITY LTD.
[IL/IL]; P.O. Box 2250, 31021 Haifa (IL).

(72) Inventors; and

(75) Inventors/Applicants (for US only): VOLOVEL-
SKY, Karni [IL/IL] (IL). GOLAN, Motti [IL/IL] (IL).
GOLDGERG, Nitzan [IL/IL] (IL).

(74) Agent: FRIEDMAN, Mark; 7 Jabotinsky St., 52520 Ra-
mat Gan (IL).

(81) Designated States (unless otherwise indicated, for every
kind of national protection available): AE, AG, AL, AM,
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,
KG, KP, KR, KZ, LC, LK, LR, LS, LI, LU, LV, MA, MD,
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,
ZW.

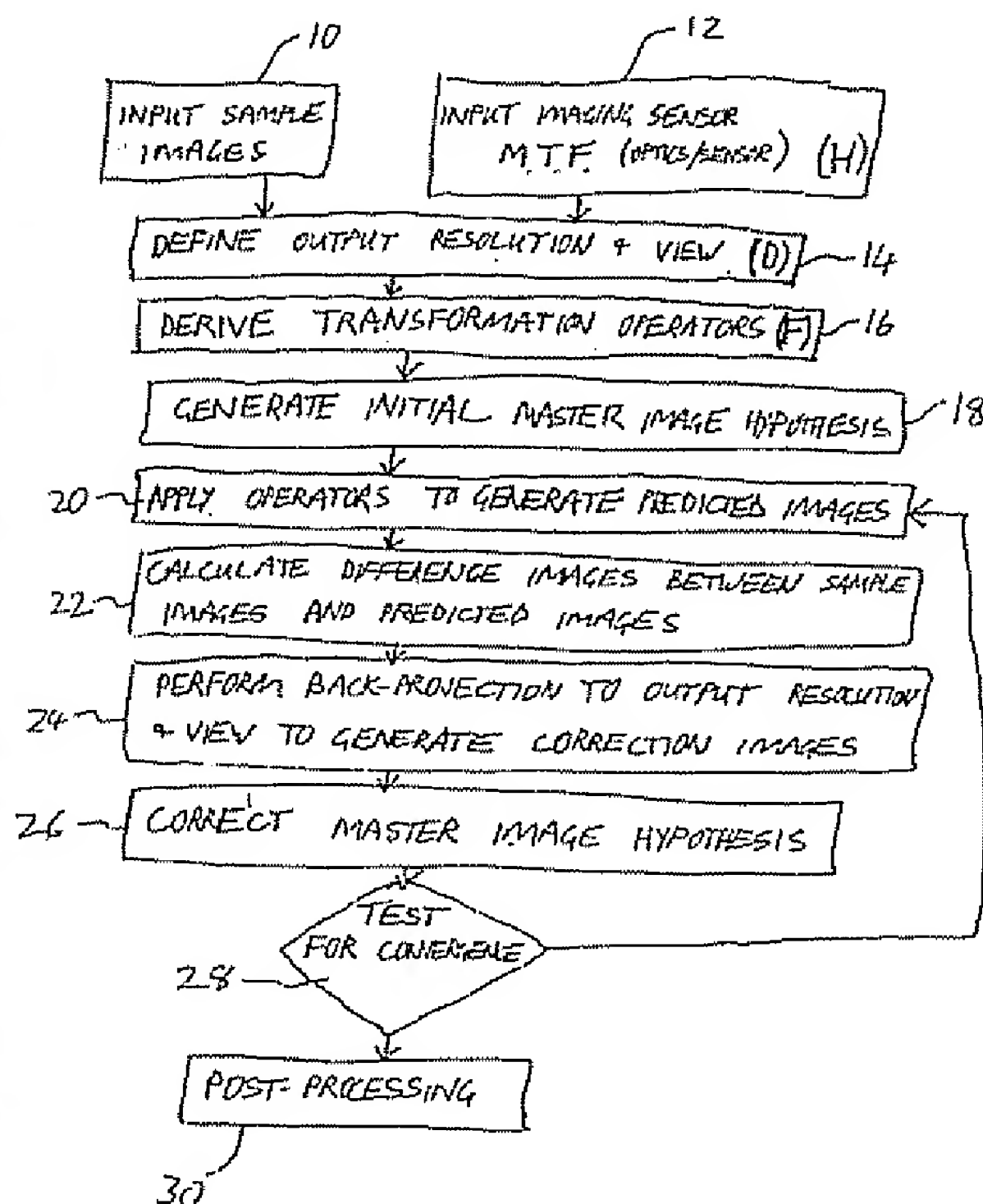
(84) Designated States (unless otherwise indicated, for every
kind of regional protection available): ARIPO (BW, GH,
GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM,
ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),
European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI,
FR, GB, GR, HU, IE, IS, IT, LI, LU, MC, NL, PL, PT, RO,
SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN,
GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— without international search report and to be republished
upon receipt of that report

[Continued on next page]

(54) Title: SUPER-RESOLUTION IMAGE PROCESSING



(57) Abstract: A method for iterative derivation of a master image from sampled images of non-identical, at least partially overlapping, regions of a scene. The method includes defining a transformation operator mapping positions within the master image to corresponding positions in the sampled image; a distortion operator simulating a modulation transfer function associated with an imaging sensor from which the sampled image was generated; and a sampling operator for reducing an image from the output resolution to the resolution of the sampled image. For each sampled image the transformation operator, distortion operator and sampling operator are applied to a current master image hypothesis to generate a predicted image. A difference image is calculated which has pixel values corresponding to the difference in corresponding pixel values between the sampled image and the predicted image. A back-projection of each of the difference images is performed to generate a correction image for the current master image hypothesis. Finally, the correction images are employed to perform a correction to the current master image hypothesis to generate a new master image hypothesis. The correction to the current master image hypothesis includes combining the correction images by deriving a weighted average of values of corresponding pixels in the correction images. The weight of each pixel in each correction image is calculated as a function of a distance as measured in the sampled image between: a point in the sampled image to which the pixel in the correction image is mapped by the transformation operator; and at least one pixel centroid proximal to that point.

WO 2005/072060 A2



For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette